IN THE SPECIFICATION

Please substitute the following paragraph for the paragraph starting at page 4, line 5 and ending at line 19. A marked-up copy of this paragraph, showing the changes made thereto is attached.

B1

This optical system is called an off-axial, optical system because the optical system includes a surface in which at an intersecting point between the reference axis corresponding to the optic axis and the component surface the reference axis does not agree with the normal to the surface but makes a finite angle other than 0 therewith (the definition of the off-axial, optical system). Surfaces of this type are called off-axial surfaces or off-axial curved surfaces. In this case, the imaging optical system 5 is also composed of a front element 10 (the surfaces 10-1, 10-2) composing the object-side imaging element and a rear element 11 (the surfaces 11-1, 11-2, 11-3, 11-4) composing the image-side imaging element, the elements 10, 11 being incorporated.

Please substitute the following paragraph for the paragraph starting at page 33, line 22 and ending at page 34, line 10. A marked-up copy of this paragraph, showing the changes made thereto is attached.

B2

Fig. 1A is a sectional view of major part of an embodiment of an optical system according to the present invention, also illustrating optical paths. Fig. 1B are spot diagrams in the optical paths of Fig. 1A. Numeral 1 designates the object plane. Numeral 5 represents an optical element in which a plurality of reflective surfaces having respective curvatures (curved surfaces) are integrally formed, which composes an element of the imaging

B2 end

optical system. The optical element 5 has an entrance refractive surface 10-1, four reflective surfaces including mirror 10-2, mirror 10-3, mirror 11-1, and mirror 11-2, and an exit refractive surface 11-3 formed in order along the reference-axis ray from the object side in the surface of a transparent body (optical material), thus forming a non-coaxial, off-axial, optical system.

Please substitute the following paragraph for the paragraph starting at page 40, line 3 and ending at line 15. A marked-up copy of this paragraph, showing the changes made thereto is attached.

B3

When the object-side imaging element 10 and the image-side imaging element 11 each include the astigmatism independent of the field angle (the on-axis astigmatism) as described above, even if there is a noise source such as the dust, bubble, or flaw near the intermediate image plane 2 (at or near the plane 2), the on-axis astigmatism prevents the noise source from eclipsing all image information from the object points on the object plane 1; and the noise source is not imaged as a point on the final image plane 3 but is blurred by the on-axis astigmatism, thus flattening the (disturbance of) light intensity distribution on the image plane due to the noise source.

Please substitute the following paragraph for the paragraph starting at page 40, line 16 and ending at page 41, line 26. A marked-up copy of this paragraph, showing the changes made thereto is attached.

B4

In general the size of the spot near the intermediate image plane 2 due to the on-axis astigmatism deliberately generated on the intermediate image plane 2 differs depending

B4 rel

upon tolerance specifications of noise caused by the noise source, but it is two or more times, preferably three or more times, the size of the noise source posing the problem even at the minimum aperture value (which relates to the resolution of the image pickup device and which is given approximately by (Eq 1) described previously); in that case, since it is roughly estimated that an amount of light eclipsed by the noise source is proportional to approximately the square of a ratio of diameters, the amount of eclipsed light is not more than 25 % (which is a closely permissible level though the effect is recognized, from the empirical aspect), desirably not more than 11 % (which is a level in which the effect can be recognized first with attention, from the empirical aspect), thereby achieving the effect of flattening the disturbance of light intensity distribution on the image plane due to the noise source at all aperture values. This means that for the minimum resolution b given by the size of the pixels of the image pickup device or the like, when $\beta 11$ represents the image magnification of the image-side imaging element 11 in the case where the intermediate image plane 2 is imaged on the final image plane 3 on which the image pickup device is located, the size of the spot, which is two or more times, desirably three or more times, ((Eq 1) described previously), is defined to be not less than the following:

$$10 \cdot b/|\beta 11| \qquad \text{(Eq 2);}$$

desirably, not less than the following:

$$15 \cdot b/|\beta 11| \qquad \text{(Eq 3);}$$

whereby the effect of flattening the disturbance of light intensity distribution on the image plane due to the noise source can be achieved at all aperture values.

Please substitute the following paragraph for the paragraph starting at page 49, line 11 and ending at page 50, line 4. A marked-up copy of this paragraph, showing the changes made thereto is attached.

B5

In general the size of the spot near the intermediate image plane due to the "aberration of torsion" deliberately generated on the intermediate image plane differs depending upon tolerance specifications of noise caused by the noise source; however, if the spot size is two or more times, preferably three or more times, the size of the noise source posing the problem at the minimum aperture value (which relates to the resolution of the image pickup device and which is given approximately by (Eq 1) described previously), it is roughly estimated that the amount of light eclipsed by the noise source is not more than 25 % (which is a closely permissible level though the effect is recognized, from the empirical aspect), desirably not more than 11 % (which is a level in which the effect can be recognized first with attention, from the empirical aspect), as in Embodiment 1, thereby achieving the effect of flattening the disturbance of light intensity distribution on the image plane due to the noise source at all aperture values.

Please substitute the following paragraph for the paragraph starting at page 50, line 5 and ending at line 21. A marked-up copy of this paragraph, showing the changes made thereto is attached.

B6

This means that for the minimum resolution b given by the size of the pixels of the image pickup device or the like, when $\beta 11$ represents the image magnification of the image-side imaging element 11 in the case where the intermediate image plane 2 is imaged on the final image plane 3 on which the image pickup device is located, the size of the spot, which is

two or more times, desirably three or more times, ((Eq l) described previously), is defined to be not less than the following:

B6 end

$$10 \cdot b/|\beta 11| \qquad \text{(Eq 2);}$$

desirably, not less than the following:

$$15 \cdot b/|\beta 11| \qquad \text{(Eq 3);}$$

whereby the effect of flattening the disturbance of light intensity distribution on the image plane due to the noise source can be achieved at all aperture values.

Please substitute the following paragraph for the paragraph starting at page 53, line 19 and ending at page 54, line 2. A marked-up copy of this paragraph, showing the changes made thereto is attached.

B7

Figs. 4A, 4B, and 4C are conceptual drawings of a major part of Embodiment 3 of the optical system according to the present invention. In this embodiment, the optical system involving the intermediate imaging is not a single lens but a zoom optical system. The zoom optical system as an off-axial, optical system corresponding to this embodiment is disclosed in Japanese Patent Application Laid-open No. 8-292372, wherein the image on the object plane 1 is formed by intermediate imaging and the intermediate image is imaged on the final image plane.

Please substitute the following paragraph for the paragraph starting at page 75, line 11 and ending at page 76, line 1. A marked-up copy of this paragraph, showing the changes made thereto is attached.

B8

In Fig. 9 reference numeral 20 designates an optical element having a plurality of curved, reflective surfaces, which is made of a transparent body such as glass. In the surface of the optical element 20 there are a concave, refractive surface (entrance surface) R2 having a negative refractive power, five reflective surfaces of concave mirror R3, convex mirror R4, concave mirror R5, reflective surface R6, and concave mirror R7, and a convex, refractive surface (exit surface) R8 having a positive refractive power, formed in the order of passage of rays from the object. R1 represents the stop located on the object side of the optical element 20 and R9 the final image plane, on which the image pickup surface of the image pickup device such as CCD is located. The two refractive surfaces are rotationally symmetric, spherical surfaces, and all reflective surfaces are surfaces symmetric only with respect to the YZ plane.

Please substitute the following paragraph for the paragraph starting at page 81, line 7 and ending at line 24. A marked-up copy of this paragraph, showing the changes made thereto is attached.

B9

In Fig. 11 reference numeral 20 designates an optical element having a plurality of curved, reflective surfaces, which is made of a transparent body such as glass. In the surface of the optical element 20 there are a concave, refractive surface (entrance surface) R2 having a negative refractive power, five reflective surfaces of concave mirror R3, convex mirror R4, concave mirror R5, reflective surface R6, and concave mirror R7, and a convex, refractive surface (exit surface) R8 having a positive refractive power, formed in the order of passage of rays from the object. R1 represents the stop located on the object side of the optical element 20 and R9 the final image plane, on which the image pickup surface of the image pickup device

B9 end

such as CCD is located. The two refractive surfaces are rotationally symmetric, spherical surfaces, and all reflective surfaces are surfaces symmetric only with respect to the YZ plane.

Please substitute the following paragraph for the paragraph starting at page 86, line 13 and ending at page 87, line 3. A marked-up copy of this paragraph, showing the changes made thereto is attached.

B10

In Fig. 13 reference numeral 20 designates an optical element having a plurality of curved, reflective surfaces, which is made of a transparent body such as glass. In the surface of the optical element 20 there are a concave, refractive surface (entrance surface) R2 having a negative refractive power, five reflective surfaces of concave mirror R3, convex mirror R4, concave mirror R5, reflective surface R6, and concave mirror R7, and a convex, refractive surface (exit surface) R8 having a positive refractive power, formed in the order of passage of rays from the object. R1 represents the stop located on the object side of the optical element 20 and R9 the final image plane, on which the image pickup surface of the image pickup device such as CCD is located. The exit surface is a rotationally symmetric, spherical surface, and all reflective surfaces are surfaces symmetric only with respect to the YZ plane.

Please substitute the following paragraph for the paragraph starting at page 91, line 15 and ending at page 92, line 5. A marked-up copy of this paragraph, showing the changes made thereto is attached.